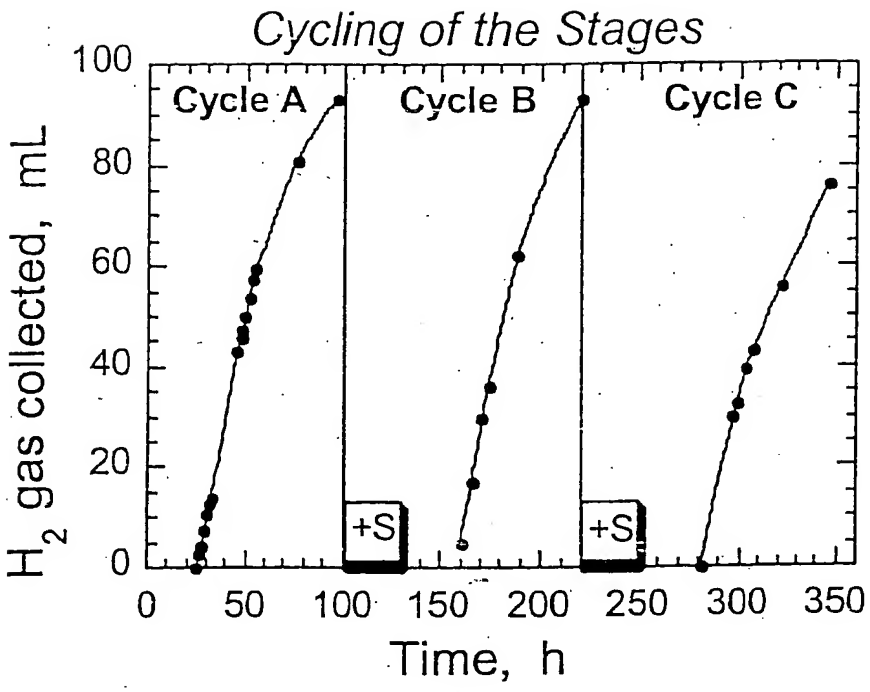

Fig. 1

Chlamydomonas reinhardtii chloroplast Sulfate Permease *(SulP)* gene structure

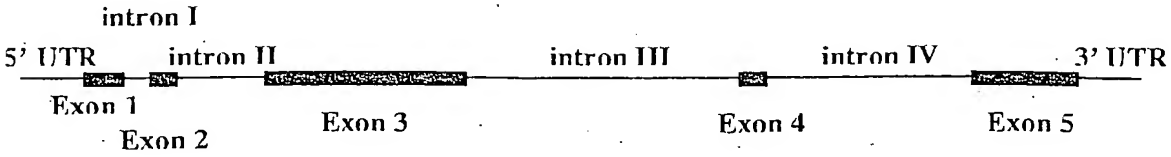

Fig. 2

C. reinhardtii chloroplast Sulfate Permease *(SulP)* amino acid sequence

MERVCSHQLASSRGRPCIAGVQRSPIRLGTSSVAHVQVSPAGLGRYQRQRLQVVASAAAA
AAFDPPGGVSAGFSQPQQQLPQQHPRQPQAVAEVAVAESVSAPASAAPSNDGSPTASMDG
GPSSGLSAVPAAATATDLFSAAARLRLPNLSPIITWTFMLSYMAFMLIMPITALLQKASL
VPLNVFIARATEPVAMHAYYVTFSCSLIAAAINCVFGFVLAWVLVRYNFAGKKILDAAVD
LPFALPTSVAGLTLATVYGDEFFIGQFLQAQGVQVVFTRLGVVIAMIFVSFPFVVRTMQP
VMQEIQKEMEEAAWSLGASQWRTFTDVVLPPLLPALLTGTALAFSRALGEFGSIVIVSSN
FAFKDLIAPVLIFQCLEQYDYVGATVIGTVLLLISLVMMLAVNQLQKLARK*

Fig. 3

Coding sequence of *CrcpSulP*

5'UTR:173 bp, Exon1: 124 bp, intronI: 77 bp, Exon2: 78 bp, intronII: 279 bp,Exon3: 620 bp, intronIII: 834 bp,Exon4: 87 bp, intronIV: 699 bp, Exon5: 327 bp, 3'UTR: 575 bp

Total length:3873 bp

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GAACTCCAGCCTGCGACGATGCAAAGCCTTTCTTGAGCGGGTTGATGGAC
TTTGCTTTGTTATCTGTCCAGTAAGCCACCAGACACTACCAAGTAGAGTA
ATCCATTTGTATAGGTACAGAAT ATGGAGCGAGTTTGCAGCCATCAGCTT
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CCGACTAGGGACTTCAAGCGTTGCTCATGTGCAGGTCTCTCCGGCAG GTA
AGCACCGCGCTCGGCGGCGTGTACACATGGGGCCGTCAGGCCAACTGCGT
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CGGCCTCAGCGCCGTGCCCGCCGCCGCCACCGCCACCGACCTCTTCTCCG
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CACCATGCAGCCCGTCATGCAG GTGAGAGCGCCCAGGAGGCGGAGCCATG
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Fig. 4A

CTTGGGGAGTAATGTGGGGCGGATGGGGTGGCAGCCTGGCAGGGTATGGG
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GTGATGATGTTGGCGGTGAACCAGCTGCAGAAGCTGGCGCGCAAG TGAGG
GGCTGAGGCGTTTGAGGAGAGTGGGCGTCTGCGGAGGCGCTTGTGGCGCA
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GGGATTGATTAGGCGGCGAATTGACGCAAATCCACGGGGGCTGTGGCTTG
GGGGAGGCAGGGATTGAGCGAAGGACGCACTGCAAGCTCAGGCAGTCGCA
TGCCCGTACCCTGCTTCTGGTCCAGTGTGGAGACAAGACTGGCAATCGTG
GTCCTTTGCAATTCATGGCGCGC

Fig. 4B

Full length cDNA sequence of *CrcpSulP*: 1984 bp

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GTAAGCCACCAGACACTACCAAGTAGAGTAATCCATTTGTATAGGTACAGAAT
ATGGAGCGAGTTTGCAGCCATCAGCTTGCCTCGTCGCGAGGGAGGCCATGCATCGCTGGG
GTGCAGCGGTCGCCCATCCGACTAGGGACTTCAAGCGTTGCTCATGTGCAGGTCTCTCCG
GCAGGCCTTGGGAGATATCAACGGCAAAGACTGCAAGTCGTGGCGTCTGCAGCTGCGGCA
GCGGCTTTCGACCCTCCTGGAGGTGTCTCCGCCGGGTTCTCGCAGCCGCAACAGCAGCTG
CCACAACAGCA CCCACGCCAACCACAGGCGGTGGCGGAGGTAGCTGTCGCCGAGTCAGTC
TCGGCGCCCGCTTCTGCGGCGCCCTCCAATGATGGCTCGCCCACGGCCTCCATGGACGGC
GGCCCCAGCTCCGGCCTCAGCGCCGTGCCCGCCGCCGCCACCGCCACCGACCTCTTCTCC
GCCGCGGCGCGCCTCCGCCTGCCCAACCTCTCCCCCATCATCACCTGGACCTTCATGCTC
TCCTACATGGCCTTCATGCTCA TCATGCCCATCACCGCGCTGCTGCAAAAAGCCTCGCTC
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Fig. 5

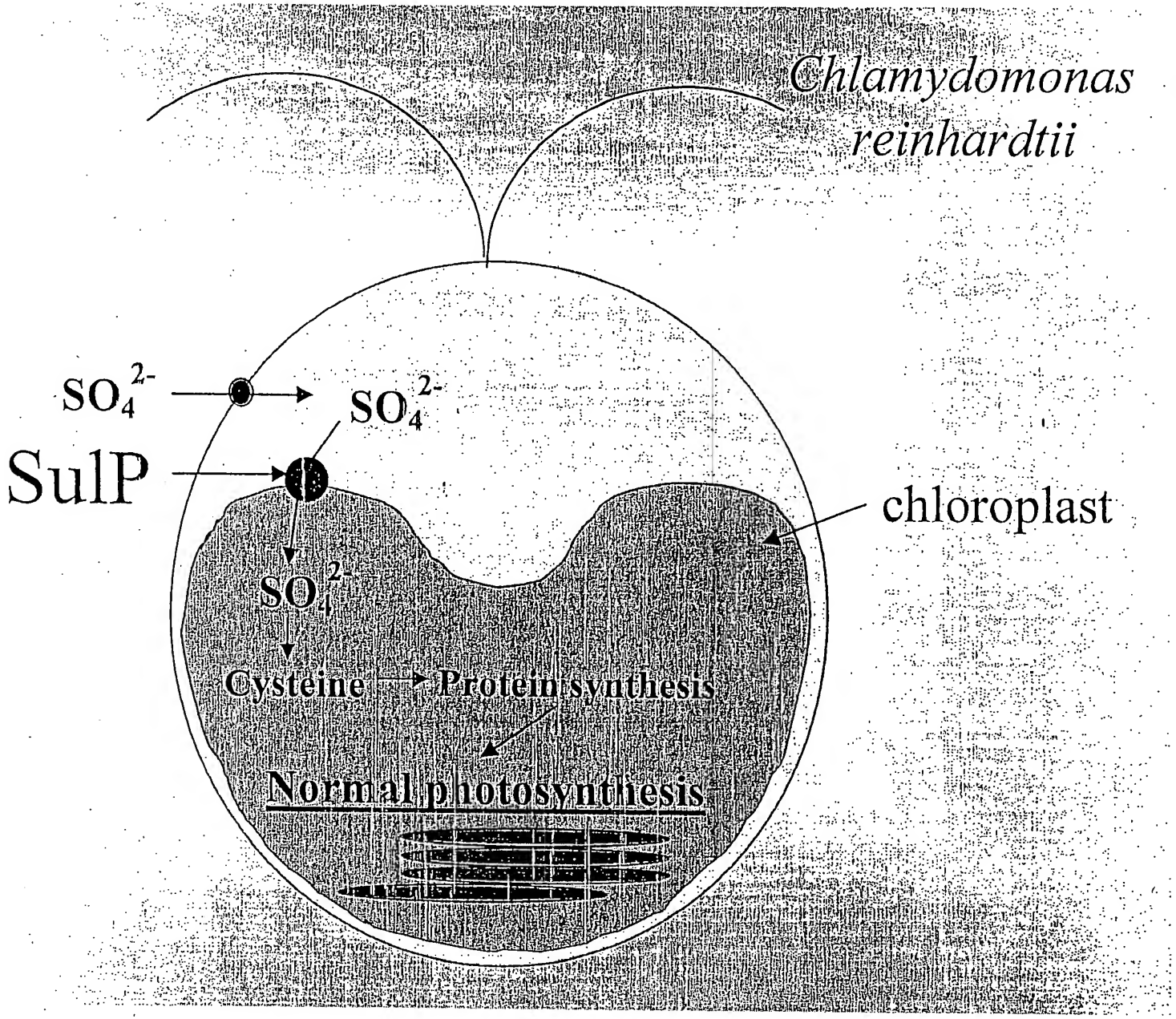

Fig. 6

Fig. 7A

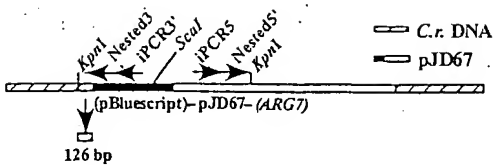

Fig. 7B

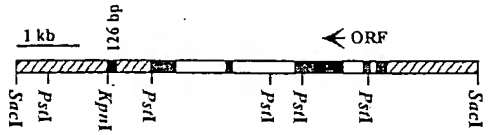

Fig. 8A

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Mesostigma      ------------------------------------------------------------
Chlamydomonas   MERVCSHQLASSRGRPCIAGVQRSPIRLGTSSVAHVQVSPAGLGRYQRQRLQVVASAAAA 60
Chlorella       ------------------------------------------------------------
Syn.PCC7942     ------------------------------------------------------------
Marchantia      ------------------------------------------------------------
Bacillus        ------------------------------------------------------------

Nephroselmis    ----------------------------------------------------MFDPKSLD-  8
Mesostigma      ------------------------------------------------------------MN-  2
Chlamydomonas   AAFDPPGGVSAGFSQPQQQLPQQHPPQPQAVAEVAVAESVSAPASAAPSNDGSPTASMDG 120
Chlorella       ------------------------------------------------------------
Syn.PCC7942     ------------------------------------------------------------MSLP-  4
Marchantia      ----------------------------------------------------MIPLFFIP-  8
Bacillus        ------------------------------------------------------MKSVR-  5

Nephroselmis    ------------------SGSRSILTMKNRLVSWAWALTLMYMLVSLILPIGALLQKSSQ  50
Mesostigma      ------------------YFSK---------LSCSWRITLGYLLFMLILPILALLSRASQ  35
Chlamydomonas   GPSSGLSAVPAAATATDLFSAAARLRLPNLSPIITWTFMLSYMAFMLIMPITALLQKASL 180
Chlorella       -------------------------MKRYPTFIKNSILLFYFFFLLILPVVVLFLLIFQ  34
Syn.PCC7942     ------------------LPSLSFTWLTR--LSWSWRFTWVYLTLILFIPIIALFLKSAS  44
Marchantia      -------------PFIILFITKGKFRFLT-KFELVLACALHYGTFILALPIFFLLYKTKQ  54
Bacillus        ------------------SWKNHNILPG--FGLSLGFTMMYLGILVLLPLSMVFINTSS  44
                                                          .*  . : :*:  ::

Nephroselmis    ESVSEFVSIATAPVAMSAYAVTLSSALIAALLNGVFGLLIAWVLVRYEFPGRRLLDAAVD 110
Mesostigma      ELFSNFWSIAMEPAAIYAYSITLSMALIASIVNGIFGIFIAWILVRYNFPGKRIVDAAID  95
Chlamydomonas   VPLNVFIARATEPVAMHAYYVTFSCSLIAAAINCVFGFVLAWVLVRYNFAGKKILDAAVD 240
Chlorella       NNWHEVLRKATDPIAVSAYLLTVQMAFYAALVNSIFGFIITWVLTRYQFWGREFLDAAVD  94
Syn.PCC7942     LPLGRIWELATQPVAVAAYEVTFGLSLAAAALNGVFGVIIAWVLTRYDFPGKKLFDSFID 104
Marchantia      QPWNILLQTALEPVVLSAYGFTFLTALLATIINAIFGLILAWVLVRYEFPGKKLLDATVD 114
Bacillus        MGWQAFWQAITEPRVLASYRLSFGAAIIAASINAVFGLLIAWVLVRYHFPGKRIIDGLVD 104
                      .     * .: :* .:.  :: *: :* :**..::*:*.**.* *:.:.*. :*

Nephroselmis    LPFALPTSVAGLTLATVYSDQGWIGTWLSSLNIQVAFTRLGVMLAMLFVSFPFVVRTLQP 170
Mesostigma      LPFALPTSVAGLTLATVYSEKGWIGHFLQSLSIKVVFTKLGVGVAMIFVSFPFVVRTLQP 155
Chlamydomonas   LPFALPTSVAGLTLATVYGDEFFIGQFLQAQGVQVVFTRLGVVIAMIFVSFPFVVRTMQP 300
Chlorella       LPFALPTSVAGLTLATVYGDQGWIGSLFNLFGFQIVFTKIGVLLAMIFVSFPFVIRTLQP 154
Syn.PCC7942     LPFALPTAVAGLTLATVYSDKGWIGQFIAPFGVQIAFTRWGVLLAMVFISLPFVVRTVEP 164
Marchantia      LPFALPTSVGGLTLMTVFNDKGWIKPICSWLNIKIVFNPIGVLLAMIFVSLPFVVRTIQP 174
Bacillus        LPFALPTAVAGIALTTLYTTNGWIGQYLEVFGIRIAFTPLGVIVALTFIGLPFVVRMVQP 164
                ********:*.*::* *::  : :*       ..::.*.  ** :*: *:.:***:* ::*

Nephroselmis    VLQDMERELEEAAWSLGASPFNTFLRVLCPPLMPAMMTGIALAFSRAVGEYGSVVIVSGN 230
Mesostigma      VLQDIEKELEEAAWSLGASSWTTFWKVIFPSLIPSLLTGIALAFSRAVGEYGSVVIIASN 215
Chlamydomonas   VMQEIQKEMEEAAWSLGASQWRTFTDVVLPPLLPALLTGTALAFSRALGEFGSIVIVSSN 360
Chlorella       VLQEMEKSLEEAAWSLGASSWETFRKVILPTLWPALFTGFTLSFSRALGEFGSIVMISSN 214
Syn.PCC7942     LLLELEVEAEEAAASLGASPSETFWRVILPPILPGVLAGVAQGFSRAVGEFGSVVIISGN 224
Marchantia      VLQNMEEDLEEAAWCLGASPWTTFWHILFPPLTPSLLTGTTLGFSRALGEYGSIVLIASN 234
Bacillus        VLQGIEKELEEASACLGANRLQTFSKIIFPTVLPALLTGFALAFARALGEYGSVVFISGN 224
                ::  :: . ***: .***.   **  :: *.: *.:::* : .*:**:**:**:*:::.*

Nephroselmis    IPFQDLIAPVLIFQRLEQYDYSGATVIGTVVLLISLTLLLAINWIQASNRKFLG- 284
Mesostigma      IPFKDLTAPVLIFQKLEQYDYTGATVIGTVILSISLFILVGINIIQSLNQMYSK- 269
Chlamydomonas   FAFKDLIAPVLIFQCLEQYDYVGATVIGTVLLLISLVMMLAVNQLQKLARK---- 411
Chlorella       LPFKDLVASVLIYQSLEQYDYLGASVIGAVVLLIALFTLLLINAFQIMKFRV--- 266
Syn.PCC7942     LPFDDLIAPVLIFERLEQYDYAGATVIGSVLLLFSLVILFVINALQNWSSRYNG- 278
Marchantia      IPMKDLVISVLLFQKLEQYDYKSATIIASFVLIISFTALFFINKIQLWKKTFHK- 288
Bacillus        LPMQTEITPLLIMTKLEQFDYAGATALAAVMLIISFFMLLFINILQWWSQRRQLS 279
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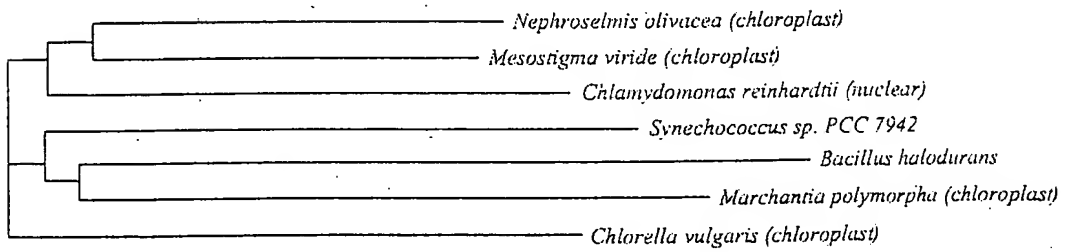


Fig. 8B

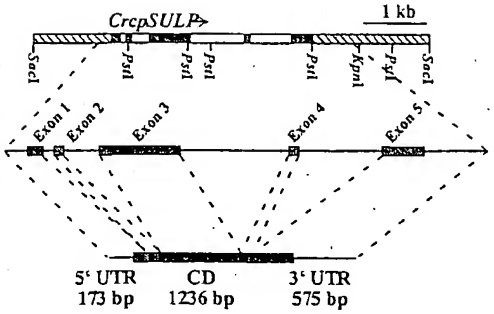


Fig. 9

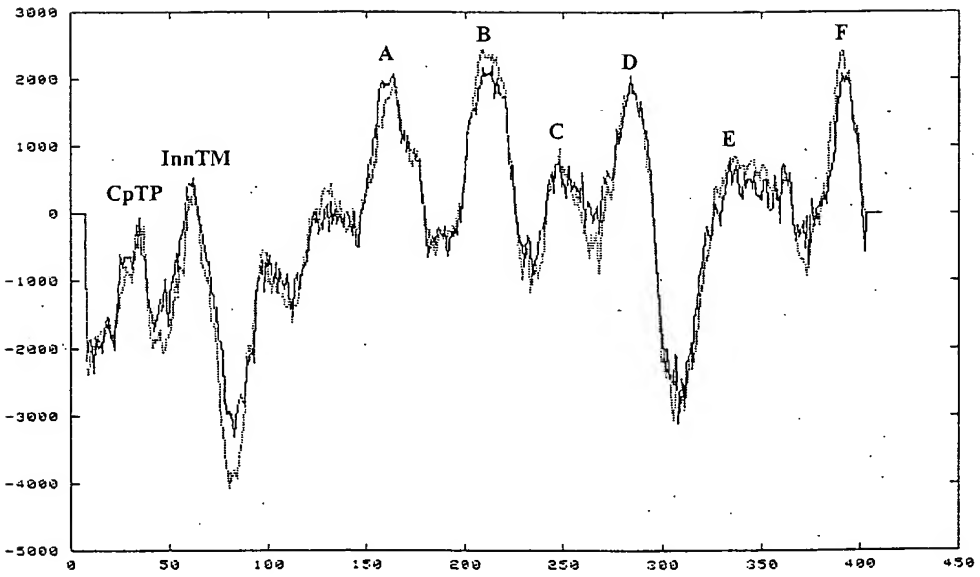


Fig. 10

Fig. 11A.

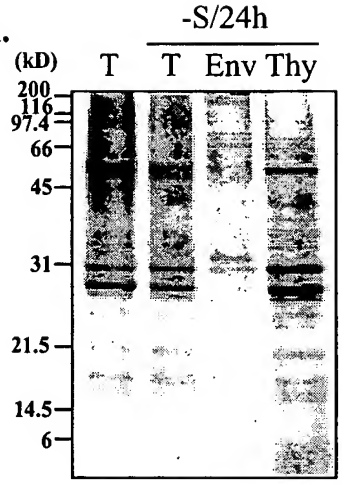


Fig. 11B.

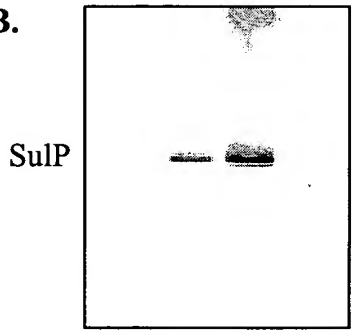


Fig. 12A.

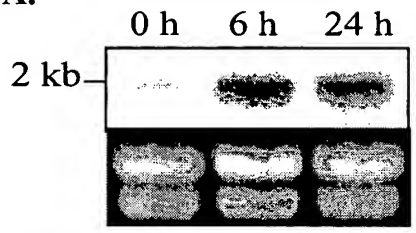
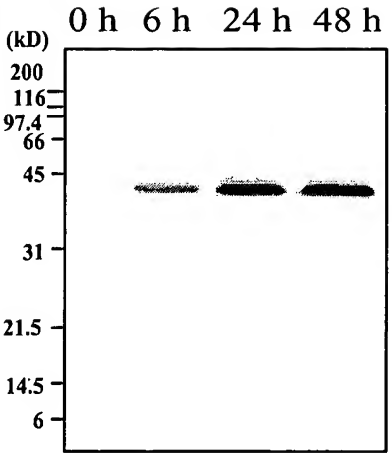


Fig. 12B.



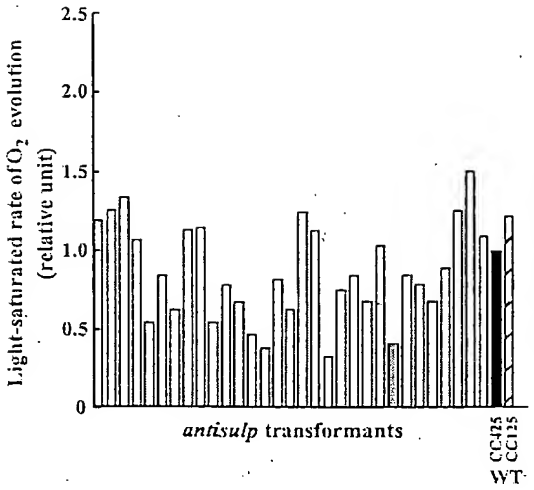


Fig. 13

Fig. 14A

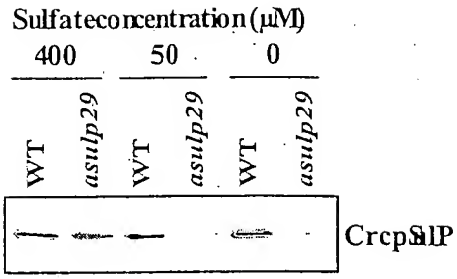


Fig. 14B

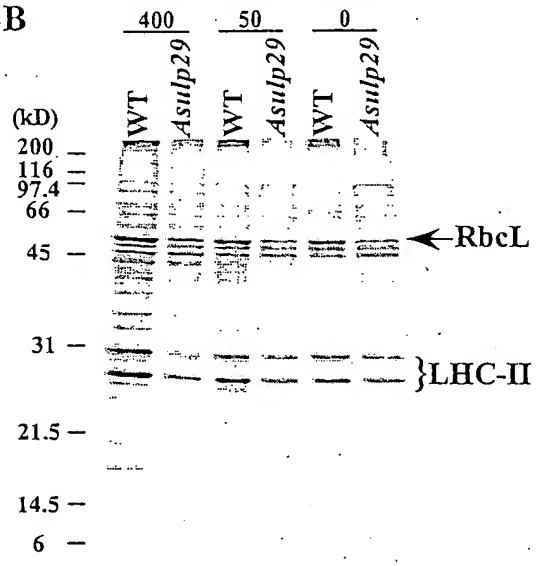


Fig. 14C

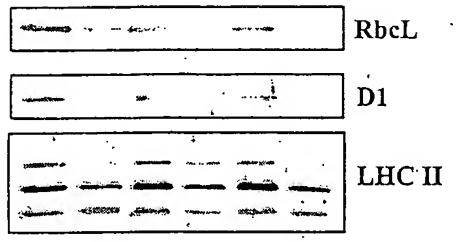


Fig. 15A

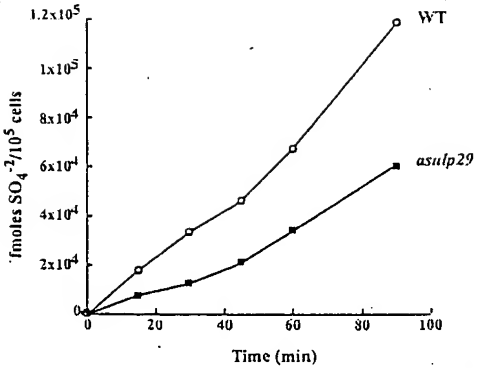
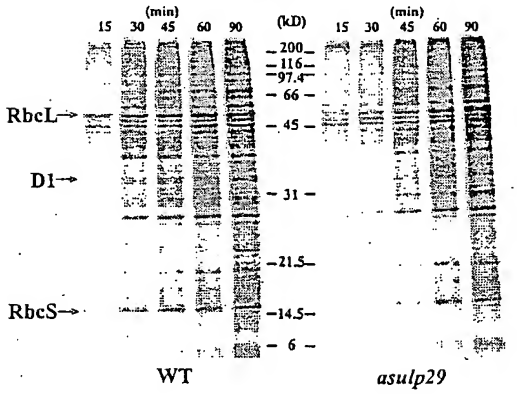


Fig. 15B



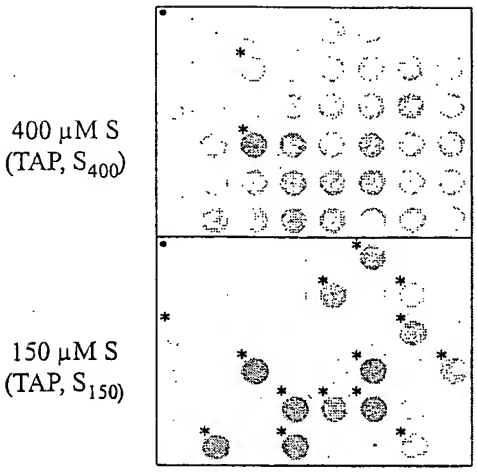


Fig. 16

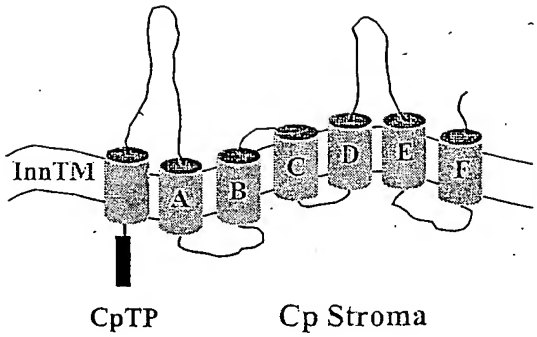


Fig. 17

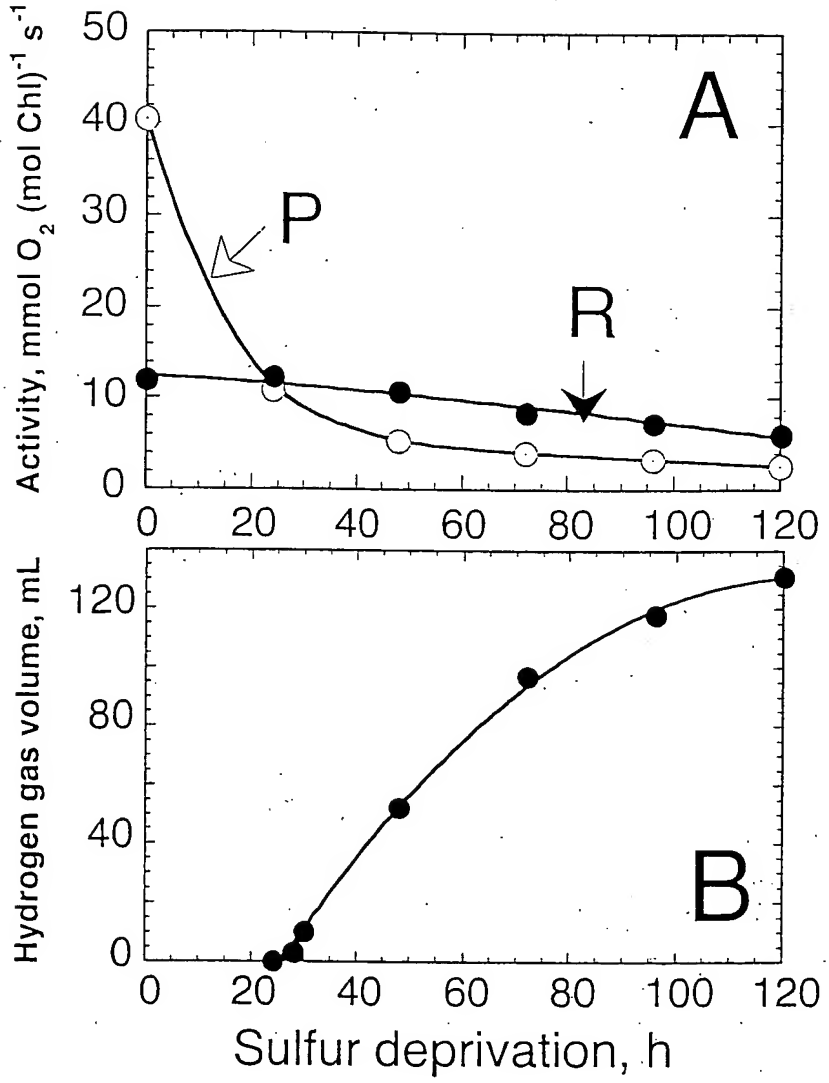
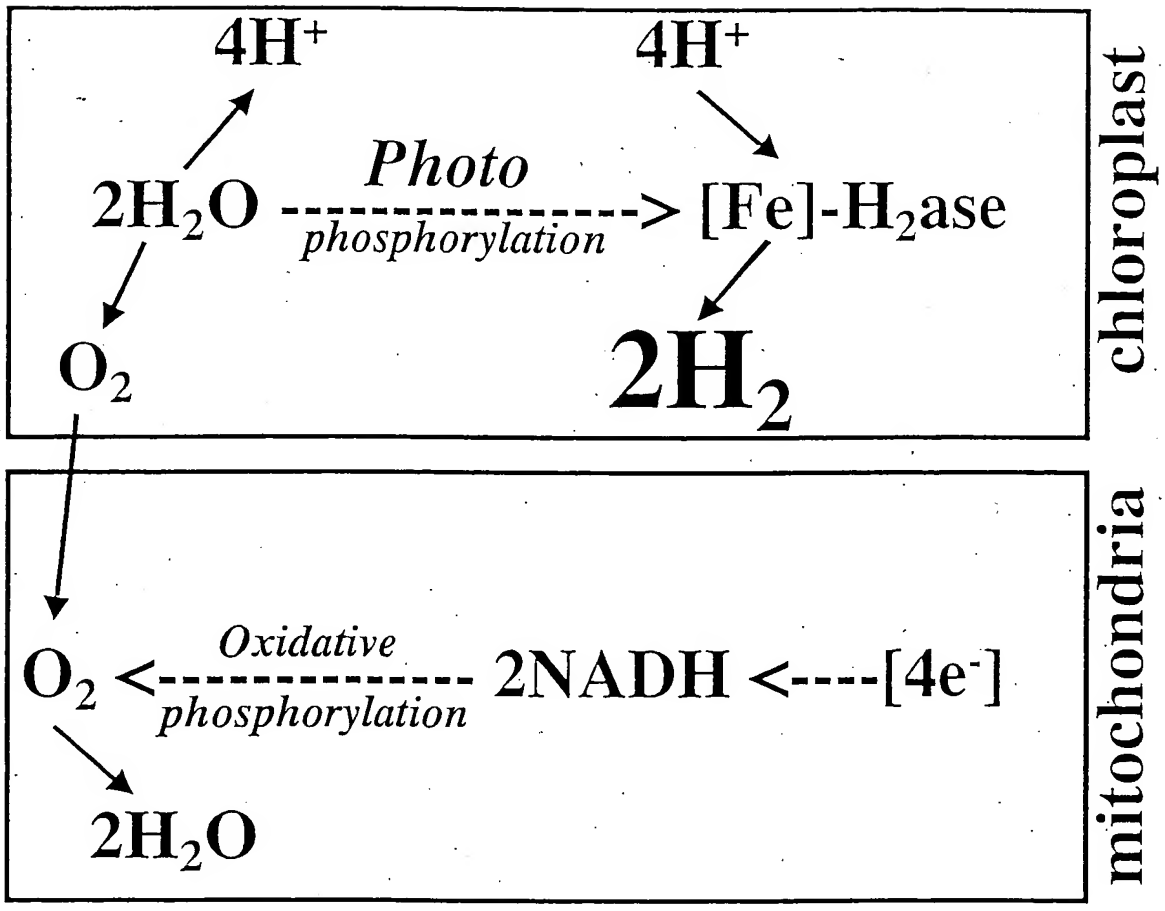


Figure 18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chloroplast
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[4e-]
2H2O
mitochondria

Figure 19

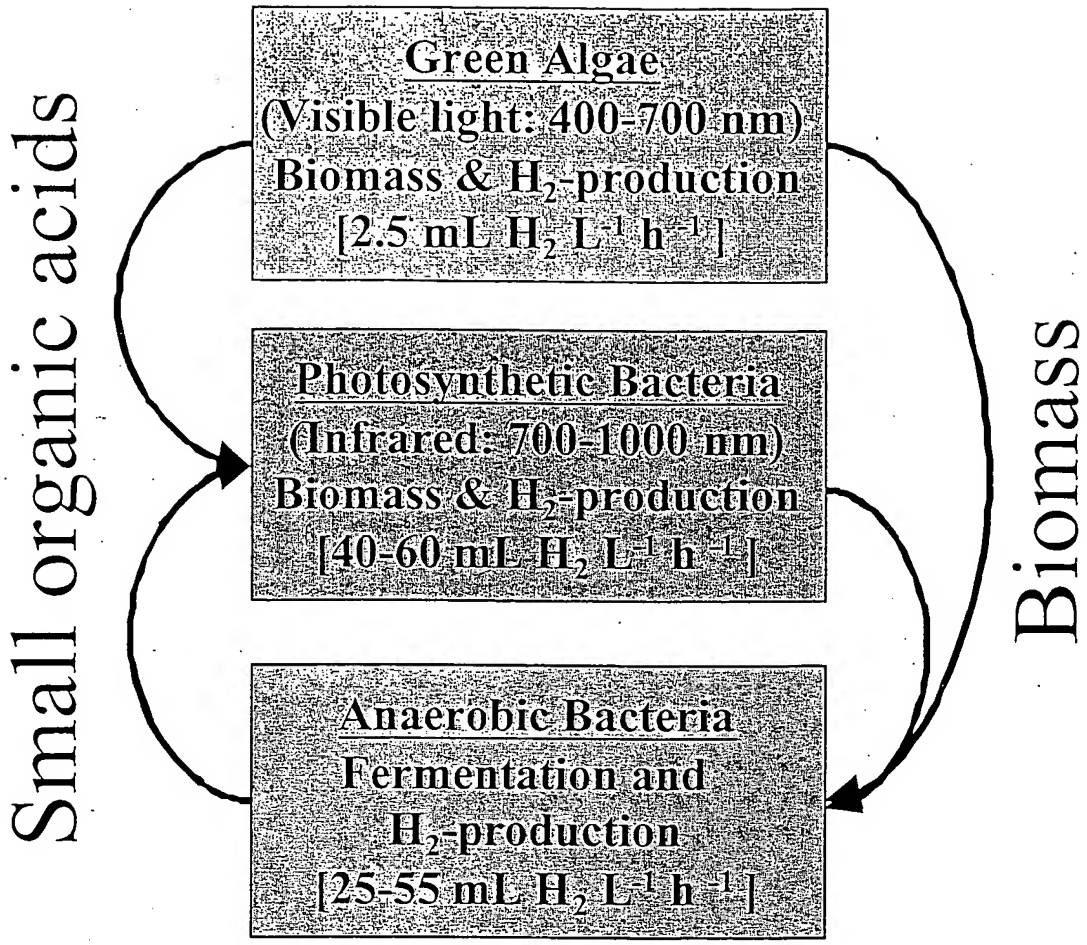

Figure 20

CATTCAATTTGCAGCGTTCCTAAAATGGCAAGCACAACGCTGCTCCAGCCCGCGCTTGGTCTGCCCTCGCGGGTAGG
GCCTCGCTCCCCTCTGTCGCTTCCCAAAATTCCTCGCGTGTGCACGCACACTAGTGCTCCCTCTACCTCAAAGTACT
GCGACTCATCATCAGTTATAGAGAGCACGCTAGGGCGGCAAACATCGGTTGCCGGGAGACCATGGCTTGCACCCCGG
CCTGCGCCTCAACAAAGCCGAGGCGACCTACTGGTCTCCAAATCGGGGGCAGCAGGAGGCATGGGCGCCCATGGAGG
GGGCTTAGGGGAACCGGTCGATAATTGGATCAAGAAGCTACTCGTTGGTGTCGCGGCGGCGTACATCGGCTTGGTCG
TGCTGGTGCCCTTCCTGAATGTCTTCGTCCAGGCGTTCGCCAAGGGCATCATTCCCTTCCTGGAGCACTGCGCGGAC
CCGGACTTTCTGCACGCACTCAAGATGACGCTGATGCTGGCGTTCGTGACGGTGCCGCTCAACACGGTGTTTGGCAC
GGTGGCCGCGATCAACCTCACGCGCAACGAGTTCCCCGGCAAGGTGTTCCTGATGTCGCTGCTGGACCTGCCCTTCT
CCATCTCGCCCGTGGTGACTGGCCTGATGCTCACGCTGCTGTACGGCCGCACCGGCTGGTTCGCGGCGCTGCTGCGG
GAGACCGGCATCAACGTGGTGTTCGCATTCACGGGCATGGCCCTGGCCACCATGTTTGTGACGCTGCCGTTCGTGGT
GCGCGAGCTGATCCCCATCCTGGAGAACATGGACCTGTCGCAGGAGGAGGCGGCGAGAACGCTGGGGGCCAACGACT
GGCAGGTGTTCTGGAACGTGACGCTGCCCAACATCCGCTGGGGCCTGCTGTACGGCGTGATCCTGTGCAACGCCCGA
GCCATGGGCGAGTTCGGAGCCGTGTCCGTCATCTCGGGCAACATCATCGGCCGCACGCAGACGCTGACGCTGTTCGT
CGAGTCCGCCTACAAGGAGTACAACACGGAGGCGGCGTTCGCGGCGGCTGTGCTGCTGAGCGCGCTGGCGCTGGGCA
CCCTGTGGATCAAGGACAAGGTGGAGGAGGCGGCGGCGGCGGAGAGCCGCAAGTAGAGAGGAGCAGGCGGCGTCGGC
AGCGGCGGCAGTGGCAGCGGCAGCGGCGGAGAGCGGCAGCTGGAGAGGAGCAGGCGGTGGCGGCGGAGCGGCGGAAA
TAGAGAGGTGCAGCAAGGAGGCAGGCGCCGACGCGAGGGGAGGGCGTGGTGGTGGGCTTGCGTGGGTGCTTGGTCCG
TGGCCAGGGTGCCTGGCCTGGGTAGTTGGTGTGTGGGTGAAGCTGATTCCTGTTTGGGTGAGGCGGCCGAGTTCCTG
AAGGAAGCAAGGAAGGACAGTGCCGCAGTGACCAGCGGGTAATGGTAAGGGAGCTGACACGTGTGGCGTTCTGTTGC
TGGTCGCCGCATGCTTAACGCAGCGGGAGCAGCTTCTCTGTCTGATGTCTAACGGGGGCGTTGTATGCTGATAATAG
ACGGAGGGCGAAGGGAGCAGGCGCGGTTCAGATGGGGTAAAAGCTGTTGGAAATCAACACGTGCAGCGGGTGGGTTG
CATTTGTGATCACTGGACGTTCTGAGTGGTCCGTGCGCCTATAGCGCGTGCTGTGCATATATACGCGCGCCGGCGCA
TAAAACATGACTGCATGTGTCGGTGTTGACGGTACAGTTATGCCGTGCCCCGTTTTACAAGCGGGATAGAGGCACAC
TCCACGTAGTATGCATTGAGCCCAGTAGACTCTGGTCAGAAGGCCGGTAAATTTACATGTGTCGTGGTGAACCCTGT
AAGTCATGGCCCAAG

Fig. 21

GTACTTCAATTGTCAGAATGGCGTCGCTGCTCGCTCAAACAACATCGCGCCTTGGCGCTCGCCCAGCTGCGCAAGCT
GGCCCTGTCGCCCAAATGGCACCGATGGCAAGCCGAGTGCAGCCGGCGATGCCTAGCGCGCTGCTCCCACTGCACGC
CAGAGCGACAACAACTTCAGTCGCTTGCCGGGCAGCCAGCATCGACAAACCTGTCGTTTACACTCCTCGAGATTCGT
CGCAACAGTCCTCCAATGGGGCAGGAGAAGTGTCCATGTCCATATCATCCATGGACGAGGTTGGACCCTCTTATGAG
GGAATCATTACAGACGCGCCTACACGACCAACGGGGCTTTATGTGCGGGTGCGCAACATGGTGAAGCACTTCAGCAC
CGCCAAAGGCCTGTTCAGGGCGGTGGACGGCGTGGACGTGGACATCGAGCCCAGCTCCATCGTGGCGCTGCTGGGGC
CCAGCGGCAGCGGCAAGACCACATTGCTGCGCCTCATTGCAGGCCTGGAGCAGCCCACGGGCGGCAACATCTACTTT
GACGACACGGACGCGACCAACCTGTCCGTCCAGGACCGCCAGATCGGCTTCGTGTTCCAGAGCTATGCGCTGTTCAA
CCACAAGACAGTTGCGGAGAACATCAAGTTTGGACTGGAGGTGCGCAAGCTCAACATCGACCACGACAAGCGCGTGG
CGGAGCTGCTGGCGCTGGTGCAGCTCACCGGCCTGGGCGACCGCTACCCGCGCCAACTGTCGGGCGGCCAGCGGCAG
CGTGTGGCGCTGGCGCGCGCCCTGGCCTCCAACCCGCGGCTGCTGCTGCTGGACGAGCCCTTTGGCGCGCTGGACGC
GGTGGTGCGCAAGCAGCTGCGCACGGGGCTGCGCGAGATCGTGCGCAGCGTGGGCGTGACCACCATCATTGTGACGC
ACGACCAGGAGGAGGCGTTCGACCTGGCGGACAAGGTGGTGGTGTTCAACAGGGGCCTGGTGGAGCAGCAGGGCAGC
CCCACCGAGATCATCAAGCGGCCGCGCACGCCCTTCATTATGAAGTTCGTGGGCGAGACCAACGTGGTGCCGGCCAC
GTCGCTGCTGGCCAAGCGCATGCGCTTCAACACCTCCAAGACCAGCGTCATGTTCCGGCCGCACGACATTAAGCTGT
TCAAGACGGTGCCGCCGGAGAGCGGCGAGGGCGCGCTGACCACGGTGGGCGCCAACGTGGCGGACAAAGCCAACCTG
GGCTGGGTGGTCAAGTACACGCTGCGCTTCGATGACGACGTGGAGTGCGAGCTGCAGCTCAGCCGCGACCAGGACGA
GCGCGAGTACAACCTGGTGGTGGGCAGCCGCGTGTTCGTGCACGTGCCGCACCGCACCATGATGGGCTTCAACGCCA
GCGACGTGGACAGCACGCCCATCGTGTAATGTGCGGGGTTGGCGGCTGTGGCCAGCGATTGTTGCAATGCAGTCCAG
CGTGCTCTTGGTTTGGTTCCAGTGACACCCATCCAGGGCACAGGTCCCTGAGCAGCGGGTGTTGGTGATGGGTTGGA
GCAGTTGTACCCGATTCTCGCATGCAAGGGGGCGGGGCGCCCACGGGGTGGGAGAGCGGAATGGCGGTGAGGTGGGC
TACTGCATGCGGCCGTGGAGGAACGGAGGGGTGCACAGGCGGGCAGGTAGACAGGCGGAGCGGGCTGGGTGAGCGGG
GCTGTAGTTTGGGGGTGGAGGCCGTGCAGACTGGTTGGGATACTGACAGATCAATGAGCGGCGTCTGCTCCATGGGT
CAGTAGGAGAGCGGTGTGGGTGTGTGCAGTTGCGAGTTCTGGAGCGTTGTGCGCCTCGCGCTGTGTGCGCGCGCCCG
TGCGTCTGCGGGCGCTGTCGGAGACGGGCGATGTACATGAAGCTGGACCTGGGCCTGTCTCACAAATATCCCTTATG
TTAATAGTAGGATGTCGCAATCGTGCCTTGGAGCCCACCTGATGTGTGTGTCACAGGTGGCAGTAGTTTGGCCTTGC
GGGAGGTAGCACGTCTTTCATGAGAGTGCGTGTGCGTGACCGCTTTTACATTGCCAATCACGCTGGAAGGTGAAACC
ATGCATCATGCGTGCTATCAGGAGATGCAGACGGCGGATTGCTGCCAAAATGTTCTGTTGTTGGTGTGCAGACTTGG
TGGCGAAGGGGCCAGGCGCCCAGGGGTATGCTGCGTGCCAAGGAGCTGCTGCCGCCACGAGTGACCAGCGAAACTTG
TAAATTGAATATTGTATCCT

Fig. 22

GGGCAGCGTATAAGTAATGTCGTTCTTGGCTCCCAGCTTAGGCGTCGCGCGGGGGATTCTGGAGCCGGCGAGTGCAG
CGAGGCCGCCTGCGCACGCGGCCGGTCACGCACCCGTTCTAACAAGCGATAGGACTGGTGGACCTGCCGCTAATCAT
GACAGGCCTGCCGGTGCTCCCAGCCCCCATGCGGCGTCGTTGACGCCCTCCAGCAGCGGGCAAGCAAGCCAGCAAGG
CGACCCCCAGCGCTCGCAGCACCAGCAAGCGCAGCGCCAGGACCAGCAGCAGTCGCAGTCGCGGTCGCTCCAATCAC
ACCTCATCACCGCGGCCACGCTGCTGCCAGCCCTGCCGCCTCCGCCTCCCGGCGGCAACGGCGACGGCGATGGCGGC
GAAGCTGCGGGGCCGCAGCCGCTCGCGGACGTCGCGGCTCAGCCGCCGGAGGTTGTGCTGACGCTGGCGTCGTTCGC
GGTGACCAAGCTGGCGTACGTGCGTGTGACGCGCGCGTTCCGGGAGTGGTACGAGCGCACGAAGGGCGTGGATGTGC
GCTTCCGCCTCACCTTCGCCGCCAGTGGCGTGCAGGCCCGCGCCGTGATCGATGGCCTGCCCGCCGACATCGTGGCC
CTGGCGCTGCCTCTGGACCTGGACAAGATCGTGTCGGCGGGGCTGATCCGGCCCGACTGGCGCAGCGCCTACCCGGC
AGCCAGCGTGGTGTGCGAGACCACCGTGGCGTTCGTGGTGCGCCAGGGCAACCCCAAGAACATCCGCACCTGGGAGG
ACCTCACGCGGGCGGGTGTGGAGGTGGTGCTGGCCAACCCCAAGACCGCCGGAGTGGCCAGGTGGATCTTCCTGGCC
CTGTGGGGCGCCAAGATGAAGAAGGGCAACGCCGCCGCGCTGGCGTATGTGCAGCGCGTGTTCGAGAACGTGGTGGT
GCAGCCGCGTGATGCGCGCGAGGCGTCGGACGTGTTCTATAAGCAGAAGGTGGGCGACGTGCTGTTGACGTACGAGA
ACGAGGTGATCCTGACCAACGAGGTGTACGGCGACAAGGCGCTGCCGTACCTGGTGCCCTCCTACAACATCCGCATC
GAGTGCCCGCTGGCGCTGGTGGACAAGGTGGTGGATGCCCGCGGCCCCGAGGTGCGCGAGGCGGCGTCCGAGTTCTG
CCGTTTCCTGTTCACGCCCGCGGCGCAGCACGAGTTCGCGCGGCTGGGCTTCCGCGTGAACCCGCGCACCTGCAAGG
AGGTGGCGGCGCAGCAGACCGGACTGCCGCCCGCAAACCTGTGGCAGGTGGACAAGGAGCTGGGCGGCTGGGCTGCG
GCCCAGAAGAAGTTTTTCGACGCTGGCGCCATCCTTGACGACATCCAGTCCGCCGTGGGCAAGCTGCGTGTGGAGCA
GCGCAAGGCGGCGCAGGCGGCGGCCAGGCGGTAGAGAGACGCGGTACAAGTGCTCGGGTGCTCAGCAGGAGCTGCAG
CAGGGGCAGCAAGAGGGCCTTGACAGGAGGGAATGGTAGGCAAAGGCGGCAGGGGAGGCGGGATGGCGGGATGAAGT
GAGGGTGTGCAAGCAGCGATGTGTGCCAAGGACGGTGTCGGCGATGTACATGATAACATGAGGAGACAGGAGCATCT
CCTGGCAGGAGGCGGCAACCGTGGAGTGTCTGAAAGGAGAACTTGATTGCTCAGTGTGGGACAGATAACGGAGGGCG
GGGTGTGGGGCGTGGGGCTTATCGGTGTGCTTCTATGGGGAGGCCTGACTGCATTGGGGGCGACGTAGTGTGATGGC
CGCTACACGCTTGCTCGGAACTGACATAAACAGGCGTTCAGGCCATGGCTGCATGAGGCTTGATGTCGTATCGCGGA
CTGTC

Fig. 23

MASTTLLQPALGLPSRVGPRSPLSLPKIPRVCTHTSAPSTSKYCDSSSVIESTLGRQTSV
AGRPWLAPRPAPQQSRGDLLVSKSGAAGGMGAHGGGLGEPVDNWIKKLLVGVAAAYIGLV
VLVPFLNVFVQAFAKGIIPFLEHCADPDFLHALKMTLMLAFVTVPLNTVFGTVAAINLTR
NEFPGKVFLMSLLDLPFSISPVVTGLMLTLLYGRTGWFAALLRETGINVVFAFTGMALAT
MFVTLPFVVRELIPILENMDLSQEEAARTLGANDWQVFWNVTLPNIRWGLLYGVILCNAR
AMGEFGAVSVISGNIIGRTQTLTLFVESAYKEYNTEAAFAAAVLLSALALGTLWIKDKVE
EAAAAESRK*

Fig. 24

MASLLAQTTSRLGARPAAQAGPVAQMAPMASRVQPAMPSALLPLHARATTTSVACRAA
SIDKPVVYTPRDSSQQSSNGAGEVSMSISSMDEVGPSYEGIITDAPTRPTGLYVRVRN
MVKHFSTAKGLFRAVDGVDVDIEPSSIVALLGPSGSGKTTLLRLIAGLEQPTGGNIYF
DDTDATNLSVQDRQIGFVFQSYALFNHKTVAENIKFGLEVRKLNIDHDKRVAELLALV
QLTGLGDRYPRQLSGGQRQRVALARALASNPRLLLLDEPFGALDAVVRKQLRTGLREI
VRSVGVTTIIVTHDQEEAFDLADKVVVFNRGLVEQQGSPTEIIKRPRTPFIMKFVGET
NVVPATSLLAKRMRFNTSKTSVMFRPHDIKLFKTVPPESGEGALTTVGANVADKANLG
WVVKYTLRFDDDVECELQLSRDQDEREYNLVXGSRVFVHVPHRTMMGFNASDVDSTPI
V*

Fig. 25

MSFLAPSLGVARGILEPASAARPPAHAAGHAPVLTSDRTGGPAANHDRPAGAPSPHAAS
LTPSSSGQASQQGDPQRSQHQQAQRQDQQQSQSRSLQSHLITAATLLPALPPPPPGGNGD
GDGGEAAGPQPLADVAAQPPEVVLTLASFAVTKLAYVRVTRAFREWYERTKGVDVRF
RLTFAASGVQARAVIDGLPADIVALALPLDLDKIVSAGLIRPDWRSAYPAASVVCETTV
AFVVRQGNPKNIRTWEDLTRAGVEVVLANPKTAGVARWIFLALWGAKMKKGNAAAL
AYVQRVFENVVVQPRDAREASDVFYKQKVGDVLLTYENEVILTNEVYGDKALPYLVPS
YNIRIECPLALVDKVVDARGPEVREAASEFCRFLFTPAAQHEFARLGFRVNPRTCKEVA
AQQTGLPPANLWQVDKELGGWAAAQKKFFDAGAILDDIQSAVGKLRVEQRKAAQAAA
RR*

Fig. 26

Chloroplast Sulfate Transport System

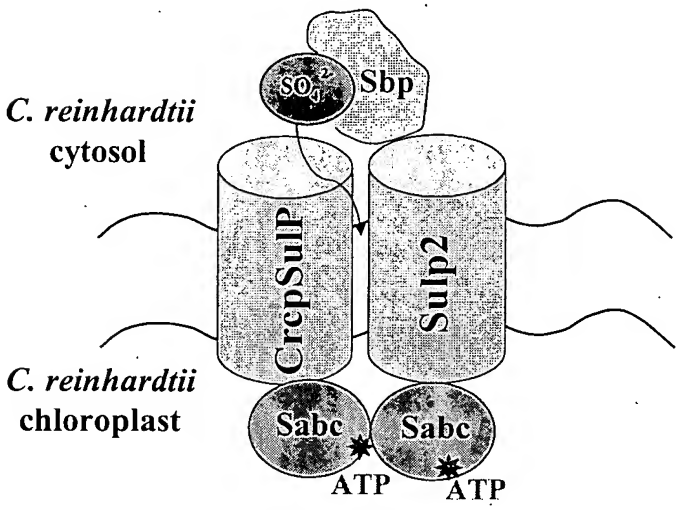

Fig. 27